



SLOVENSKI STANDARD

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Tesnilne mase za nekonstrukcijske stike v stavbah in na površinah za pešce - 1.
del: Tesnilne mase za fasade

Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1:
Sealants for facade elements

Fugendichtstoffe für nicht tragende Anwendungen in Gebäuden und Fußgängerwegen -
Teil 1: Fugendichtstoffe für Fassadenelemente

Mastics pour joints pour des usages non structuraux dans les constructions immobilières
et pour chemins piétonniers - Partie 1: Mastics pour éléments de façade

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ICS:

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91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

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EUROPEAN STANDARD
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English Version

Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1: Sealants for facade elements

Mastics pour joints pour des usages non structuraux dans les constructions immobilières et pour chemins piétonniers - Partie 1 : Mastics pour éléments de façade

Fugendichtstoffe für nicht tragende Anwendungen in Gebäuden und Fußgängerwegen - Teil 1: Fugendichtstoffe für Fassadenelemente

This European Standard was approved by CEN on 25 December 2016.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European foreword

This document (EN 15651-1:2017) has been prepared by Technical Committee CEN/TC 349 “Sealants for joints in building construction”, the secretariat of which is held by AFNOR.

This document supersedes EN 15651-1:2012.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2017, and conflicting national standards shall be withdrawn at the latest by November 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of EU Regulation.

For relationship with EU Regulation, see informative Annex ZA, which is an integral part of this document.

This document is one of the product European Standards within the framework series of EN 15651 on *Sealants for non-structural use in joints in buildings and pedestrian walkways*, as follows:

- *Part 1: Sealants for facade elements* (this document),
- *Part 2: Sealants for glazing*, [SIST EN 15651-1:2017](https://standards.iteh.ai/catalog/standards/sist/a4e0ce25-d8f7-43bd-9ae3-d22b1079c4e2/sist-en-15651-1-2017)
- *Part 3: Sealants for sanitary joints*,
- *Part 4: Sealants for pedestrian walkways*,
- *Part 5: Assessment and verification of constancy of performance, marking and labelling*.

The following significant technical changes have been implemented in this new edition:

- Clause 4.1.3 and Clause 5 have been improved;
- Clause 4.5 has been modified;
- Clause 7 and Annex ZA have been changed in accordance with the regulation (EU) No.305/2011.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15651-1:2017 (E)**1 Scope**

This European Standard specifies definitions and requirements for non-structural facade sealants intended for sealing exterior wall joints, window and door perimeter joints in building construction, including the interior face.

NOTE Provisions on assessment and verification of constancy of performance - AVCP (i.e. Product type determination and Factory Production Control) and marking of these products are given in EN 15651-5.

This European Standard does not apply to non-structural sealants in any of non-paste form, to those used in interior walls and/or partitions and to oil-based mastics.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13238, *Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 15651-5:2017, *Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 5: Evaluation of conformity and marking* (standards.iteh.ai)

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 2811-1:2016, *Paints and varnishes - Determination of density - Part 1: Pycnometer method (ISO 2811-1:2016)*

EN ISO 6927, *Buildings and civil engineering works - Sealants - Vocabulary (ISO 6927)*

EN ISO 7389, *Building construction - Jointing products - Determination of elastic recovery of sealants (ISO 7389)*

EN ISO 7390, *Building construction - Jointing products - Determination of resistance to flow of sealants (ISO 7390)*

EN ISO 8339, *Building construction - Sealants - Determination of tensile properties (Extension to break) (ISO 8339)*

EN ISO 8340, *Building construction - Sealants - Determination of tensile properties at maintained extension (ISO 8340)*

EN ISO 9046, *Building construction - Jointing products - Determination of adhesion/cohesion properties of sealants at constant temperature (ISO 9046)*

EN ISO 9047, *Building construction - Jointing products - Determination of adhesion/cohesion properties of sealants at variable temperatures (ISO 9047)*

EN ISO 10563, *Building construction - Sealants - Determination of change in mass and volume (ISO 10563)*

EN ISO 10590, *Building construction - Sealants - Determination of tensile properties of sealants at maintained extension after immersion in water (ISO 10590)*

EN ISO 10591, *Building construction - Sealants - Determination of adhesion/cohesion properties of sealants after immersion in water (ISO 10591)*

EN ISO 11600, *Building construction - Jointing products - Classification and requirements for sealants (ISO 11600)*

EN ISO 11358 (all parts), *Plastics — Thermogravimetry (TG) of polymers (ISO 11358)*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2)*

ISO 13640, *Building construction — Jointing products — Specifications for test substrates*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 6927 and the following apply.

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3.1 non-reactive sealant

mainly physical drying mechanism, without significant change in the molecular weight of the main polymer

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3.2 reactive sealant

mainly curing by chemical reaction, with significant increase of the molecular weight of the main polymer

3.3 cure

irreversible transformation of a sealant from a liquid or paste-like state into a hardened or rubber-like solid state

3.4 uncured / wet

state of a sealant prior to the above transformation

4 Requirements

4.1 Identification requirements and test methods

4.1.1 Short description of the sealant

The short description of the non-structural sealant for facade elements shall include brand name, type (general chemical family), opaque or translucent, waterborne or solvent based or solvent free, reactive or non-reactive, and one or multi-component (e.g. waterborne acrylic opaque and one component, etc.).

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The primer shall be stated for the substrate concerned, if relevant (name, chemical type, etc.).

4.1.2 Thermogravimetric test

The test shall be carried out in accordance with EN ISO 11358 on the uncured or wet sealant, between 35 °C and 900 °C, temperature slope 10 °C/min, non-oxidative condition (e.g. nitrogen). A single sample shall be used for this test. A single specimen may be tested and there shall be no significant difference between the reference curve and derivative (profile).

In the case of a multi-component sealant, each component shall be evaluated (if relevant).

4.1.3 Density**4.1.3.1 Principal**

A pycnometer is filled with the product under test. The density is calculated from the mass of the product in the pycnometer and the known volume of the pycnometer.

4.1.3.2 Method

A test temperature of $(23,0 \pm 0,5)$ °C shall be used and the test sample and pycnometer shall be conditioned to this temperature, and it shall be ensured that the temperature variation does not exceed 0,5 °C during testing.

The determination of the density shall be in accordance with EN ISO 2811-1:2016 and should be carried out using a suitable 50 cm³ calibrated pycnometer as described in EN ISO 2811-1:2016, 6.1.1. An alternative is the 50 cm³ Hubbard pycnometer as described in ISO 3507.

Measurements should be carried out on the uncured or wet sealant and in the case of a multi-component sealant, each component shall be evaluated. At least three samples shall be tested. The specific pycnometer used and the mean value, recorded to two decimal places, shall be declared. The tolerance of the declared values shall be within ± 5 %.

4.1.4 Indentation hardness (Shore hardness)

The determination of the indentation hardness shall be in accordance with EN ISO 868. The test shall be performed on the cured or dried sealant.

The exact conditions of test shall be defined by the manufacturer (i.e. thickness, cure/drying times and temperature and relative humidity, specific Shore type (A, D...), test time, temperature, etc.).

At least three samples shall be tested and five measurements taken per sample. The mean value and tolerances of all measurements, recorded to the nearest unit, shall be declared.

4.2 Conditioning, test procedure and substrates

When determining the classification of a facade sealant according to the requirements of this standard, the same conditioning procedure shall be used in all relevant test methods (Method A or Method B conditioning shall be used for all relevant tests). For each test method, three test specimens for each substrate shall be tested. The same batch of sealant (and primer, if used) shall be used in all tests. The same substrates (material and surface finish) shall be used in all tests.

The specific test conditions shall be in accordance with Table 1.

Table 1 — Specific test conditions

	Test method	Classes of non-structural sealants for facade elements						
		25LM	25HM	20LM	20HM	12,5E	12,5P	7,5P
Elongation ^a	EN ISO 7389	100 %	100 %	60 %	60 %	60 %	60 %	25 %
	EN ISO 8340	100 %	100 %	60 %	60 %	60 %	X	X
	EN ISO 8339	100 %	100 %	60 %	60 %	X	X	X
	EN ISO 10590	100 %	100 %	60 %	60 %	60 %	X	X
Amplitude	EN ISO 9046	X	X	X	X	X	±12,5 %	±7,5 %
	EN ISO 9047	±25 %	±25 %	±20 %	±20 %	±12,5 %	X	X
^a The value of elongation is given as a percentage of the original width: elongation % = [(final width - original width) / (original width)] x 100 %								

Substrates to be used in all mechanical tests concerned shall be mortar M1 or M2 and/or anodised aluminium and/or glass, according to ISO 13640.

4.3 Performance requirements and test methods for non-structural sealants for facade elements

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4.3.1 General

Classes of non-structural sealants to be used for joints in facade elements in buildings are referred to as type:

- F (= sealant for facade elements)
- EXT-INT (= exterior and interior application)
- INT (= interior application)
- CC (= cold climate).

A summary of the characteristics and classes, together with corresponding test methods for these characteristics shall be as given in Table 2.

NOTE The requirements for non-structural sealants for interior application only are covered by Table 4.

Table 2 — Summary of classes for non-structural sealants for facade elements

Characteristic	Class of sealant for facade elements							Method of test
	25LM	25HM	20LM	20HM	12,5E	12,5P	7,5P	
Elastic recovery (%)	≥ 70	≥ 70	≥ 60	≥ 60	≥ 40	< 40	< 40	EN ISO 7389
Resistance to flow (mm)	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	See 4.3.3.
Tensile properties								
1) Secant modulus (MPa)	≤ 0,4 (23 °C)	> 0,4 (23 °C)	≤ 0,4 (23 °C)	> 0,4 (23 °C)	—	—	—	EN ISO 8339
	and ≤ 0,6 (- 20 °C)	or > 0,6 (- 20 °C)	and ≤ 0,6 (- 20 °C)	or > 0,6 (- 20 °C)	—	—	—	
2) Elongation at break (%)	—	—	—	—	—	≥ 100 (23 °C)	≥ 25 (23 °C)	
Tensile properties at maintained extension	NF	NF	NF	NF	NF	—	—	EN ISO 8340
Adhesion/cohesion at variable temperatures	NF	NF	NF	NF	NF	—	—	EN ISO 9047
Adhesion/cohesion at maintained extension after water immersion	NF	NF	NF	NF	NF	—	—	EN ISO 10590
Loss of volume (%)	≤ 10 ≤ 25 ^a	≤ 10 ≤ 25 ^a	≤ 10 ≤ 25 ^a	≤ 10 ≤ 25 ^a	≤ 25 ≤ 30 ^a	≤ 25	≤ 25	EN ISO 10563
Adhesion/cohesion at constant temperature	—	—	—	—	—	NF	NF	EN ISO 9046
Adhesion/cohesion after water immersion: - Elongation (%) at 23 °C	—	—	—	—	—	≥ 100	≥ 25	EN ISO 10591

^a Water-based dispersion sealants.
NF = No Failure according to EN ISO 11600.

4.3.2 Sealants for facade elements used in cold climates

4.3.2.1 General

This test has been developed to demonstrate that elastic sealants for exterior use perform well at lower temperatures than those currently tested at in EN ISO 11600 (e.g. common winter temperatures in Northern Europe). The specific intention is to ensure that the sealant continues to perform at - 30 °C, which is a common winter temperature in cold climate areas. The test is not relevant for plastic sealants (as defined by classes 12,5P and 7,5P in Table 2).

In addition to the requirements given in Table 2, elastic non-structural sealants for facade elements required to maintain performance in cold climates (- 30 °C) shall fulfil the requirements given in Table 3.

The classification of the sealant given in Table 2 shall be determined prior to this optional additional test and the corresponding test amplitude shall be applied to this additional test.

The designation CC (cold climate) shall be declared for any sealant meeting the requirements of Tables 2 and 3. For example, Type F Class 25LM CC.

Anodised aluminium or/and glass and/or mortar M1 or M2 substrates, according to ISO 13640, shall be used.

4.3.2.2 Tensile properties - Secant modulus to EN ISO 8339:— Test procedure at $(-30 \pm 2)^\circ\text{C}$

The test specimens shall be stored at $(-30 \pm 2)^\circ\text{C}$ for at least 4 h before the start of the test. The spacers for the preparation of the test specimens shall be removed and the test specimen placed in the tensile test machine and extended at $(-30 \pm 2)^\circ\text{C}$ at a rate of $(5,5 \pm 0,7)$ mm/min until rupture occurs. The force/extension diagram shall be recorded.

4.3.2.3 Tensile properties at maintained extension to EN ISO 8340:— Test procedure at $(-30 \pm 2)^\circ\text{C}$

The test specimens shall be stored at $(-30 \pm 2)^\circ\text{C}$ for at least 4 h before the start of the test. The spacers for the preparation of the test specimens shall be removed and the test specimens placed in the tensile test machine at $(-30 \pm 2)^\circ\text{C}$ and extended at a rate of $(5,5 \pm 0,7)$ mm/min by 60 % or 100 % of the original width (to 19,2 mm and 24 mm respectively), The separators shall be used to maintain the elongation at $(-30 \pm 2)^\circ\text{C}$ for 24 h. The test specimens shall be brought to $(23 \pm 2)^\circ\text{C}$. The depth of any loss of adhesion or cohesion shall be measured using a suitable measuring device capable of reading to 0,5 mm.

Table 3 — Requirements to be suitable for use in cold climate areas

Characteristics		Classes of non-structural sealants for sealants for facade elements in cold climates					Test method
		25LM	25HM	20LM	20HM	12,5E	
Tensile properties: - Secant modulus	MPa	$\leq 0,9$	NR ^a	$\leq 0,9$	NR ^a	NR ^a	4.3.2.2
Tensile properties at maintained extension	-	NF ^b	NF ^b	NF ^b	NF ^b	NF ^b	4.3.2.3
^a NR = Not required. ^b NF = No failure according to EN ISO 11600.							

4.3.3 Resistance to flow

The resistance to flow shall be measured according to EN ISO 7390, with the precise test method modified according to the following details:

A vertical, anodised aluminium U-profile shall be used with dimensions 20 mm × 10 mm. Testing shall be carried out under two test temperature conditions:

- temperature of $(50 \pm 2)^\circ\text{C}$ and relative humidity of $(50 \pm 10)\%$;
- temperature of $(5 \pm 2)^\circ\text{C}$.

If the flow exceeds the required value, then the test may be repeated once.

4.4 Performance requirements for non-structural sealants for facade elements for interior application only

For non-structural sealants for facade elements that are only used for interior application the minimum performance requirements given in Table 4 shall be met. Facade sealants only complying with these requirements shall be clearly marked "*suitable for interior use only*" as they cannot be classified according to Table 2.